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PTO/SB/16 (08-03)

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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INVENTOR(S)					
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Michael John		Macaluso		Somerville, NJ	
Additional inventors are being named on the <u>1</u> separately numbered sheets attached hereto					
TITLE OF THE INVENTION (500 characters max)					
A system with a scalable physical layer implementation for communication over conventional electric wires delivering electricity in the wide range of voltage levels (90VAC to 20kVAC) and frequencies (40Hz to 400 Hz)					
Direct all correspondence to: CORRESPONDENCE ADDRESS					
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ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification Number of Pages <u>2</u>		<input type="checkbox"/> CD(s), Number _____			
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<input type="checkbox"/> Application Date Sheet. See 37 CFR 1.76					
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT					
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.		FILING FEE Amount (\$)			
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
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[Page 1 of 2]

Respectfully submitted,

SIGNATURE

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Date 12/23/03

REGISTRATION NO. _____

(if appropriate)

Docket Number: EPL 065

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop Provisional Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Additional Page

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Docket Number EPL 065

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Number 2 of 2

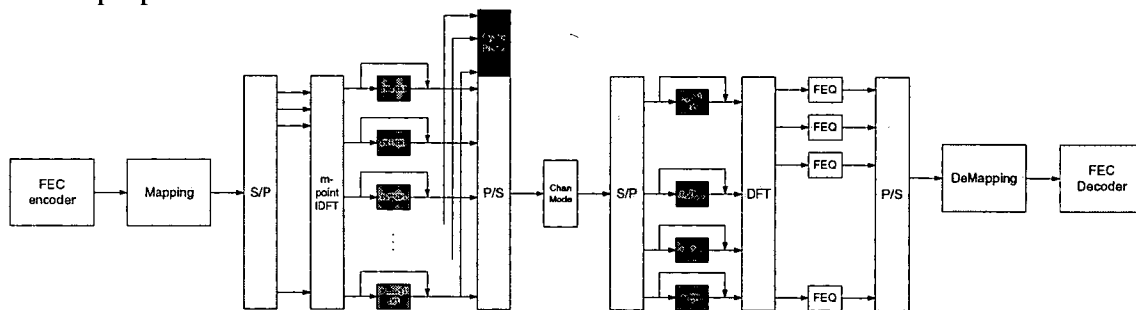
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A system with a scalable physical layer implementation for communication over conventional electric wires delivering electricity in the wide range of voltage levels (90VAC to 20kVAC) and frequencies (40Hz to 400 Hz)

Inventors: Oleg Logvinov, Bo Zhang, Michael Macaluso

There exists the need to provide a robust communication over conventional electric wires. Depending on the application and/or region of the world the requirements associated with physical layer implementation may vary. In some cases a high degree of spectral containment is desirable, in other cases the ability to operate in the presence of impairments is preferable. The method described in this invention allows a cost-efficient implementation of the physical layer. The method results into a re-configurable physical layer design that allows the implementation to be configured to operate as either a wavelet based multi-carrier communication block or the same block based on classic OFDM principals.

In the preferred embodiment of the system, backwards compatibility with the well-known HomePlug 1.0 specification is achieved. The preferred embodiment illustrates the application of the method, but should not be viewed as a limiting factor to scope of the method proposed.



Note: Red for wavelet only; Blue for FFT only; Yellow used for both
 Note: To backward compatible, M=1536/76 points FFT @ 75MHz
 Note: To backward compatible, FEC=TPC + Reed Solomon Codes + Convolutional Codes
 Note: Prefer Reed Solomon Codes + Trellis Codes
 Note: For large scale environment, bypass h(k), add cyclic Prefix for each symbol;
 For small scale environment, without cyclic Prefix, go through h(k)

The system operates in two modes. One mode, is a wavelet-like filtered-band OFDM or FFT OFDM. This mode is ideal where there is a small environment or light multi-path environment such as smaller homes in Japan or Korea. In this mode, the system works in the wavelet-like mode, which can yield highest throughput by omitting the cyclic prefix. Studies find that filtered-band OFDM only has ability of handling multi-path of about 10% of the symbol length. The second mode, for large-scale environments, or in environments where the impulse response length is longer than 10% of symbol's length, the system will insert the cyclic prefix at the beginning of the symbol. In this mode, the system runs in a traditional FFT-based OFDM mode, bypassing the wavelet filter.

Claims:

1. A method of a cost-efficient physical layer implementation that combines both wavelet and classic OFDM-based communication over conventional electric wires operating at various voltage and frequency levels.
2. A method in claim 1 that further provides a compatibility with a well-known HomePlug 1.0 specification.
3. A method of intelligent mode of operation selection based on the dynamic channel analysis.
4. A method of mode of operation selection based on the region profile.
5. A method of mode of operation selection based on the application profile.
6. A method of a symbol-size selection based on the connection-oriented profile.
This approach allows an improved efficiency in channel utilization by selecting small (therefore shorter) symbols in tolerable channel conditions for small payloads such as voice codec packets.
7. A system that implements the above methods.
8. An SoC that provides an implementation of the above where configuration and control are achieved under software control.